Santa Susana Field Laboratory
Monthly Status Report
April 2018

This monthly update is to inform the community about Santa Susana Field Laboratory (SSFL) investigation and cleanup activities that occurred in April 2018 as well as those that are planned for coming months under the California Department of Toxic Substances Control's (DTSC) oversight. A project overview for The Boeing Company (Boeing), United States Department of Energy (DOE) and National Aeronautics and Space Administration (NASA) SSFL areas is included at the end of this report. Documents referenced in this monthly status report that have been reviewed and commented on by DTSC are hyperlinked for easy access. Documents that are currently under DTSC's review will be made available once DTSC's review comments have been issued.

1 SSFL Activities Completed During APRIL 2018

DTSC

California Environmental Quality Act (CEQA)

DTSC's draft Program Environmental Impact Report (draft PEIR) for the SSFL project was issued for public review on September 7, 2017. The 90-day public comment period ended on December 14, 2017. DTSC is currently compiling and reviewing comments that were submitted during the comment period as well as verbal comments received at public hearings. The responses to comments will be included in the final PEIR.

Program Management Plan

DTSC's draft Program Management Plan (draft PMP) for the SSFL project was issued for public review with the draft PEIR on September 7, 2017. The 90-day public comment period ended on December 14, 2017.

Site Wide Air Monitoring Plan

Air monitoring will be conducted to evaluate baseline concentrations of airborne dust, volatile organic compounds, and radionuclides at SSFL prior to commencing cleanup activities. This data will be used to evaluate what, if any, impacts to air quality are caused by cleanup activities. In a letter dated November 14, 2017, DTSC approved the *Final Baseline Air Monitoring Work Plan.* for the activity. In a Technical Memorandum dated November 15, 2017 Boeing Proposed New Air Monitoring Locations for three of their air monitoring locations. Additionally, NASA revised the location of several of their air monitoring stations. DTSC reviewed and approved the locations in a letter submitted to the RPs dated January 30, 2018.

In DTSC's approval letter for the Final Baseline Air Monitoring Work Plan, DTSC indicated an expectation for the start of monitoring by February 10, 2018. On November 27, 2017 NASA submitted a letter on behalf of NASA, Boeing, and DOE indicating additional time was necessary for installation of the stations. The letter requested an extension to April 15, 2018 for the start of air monitoring. The official start date of the air monitoring is April 15, 2018 as described in the letter from Mark Malinowski to the RPs.

NASA

SOILS:

On May 2, 2018, DTSC issued comments on NASA's September 2016 Draft Soil Treatability Study Report, which summarized the results of studies conducted on six soil treatment technologies by NASA in 2015 and 2016. DTSC concurred with the major conclusions of the NASA document and recommended that the document be finalized. NASA's treatability studies will be referenced in future NASA proposals for final soil remediation methods.

NASA submitted a revised *Soil Data Summary Report* to DTSC on February 22, 2017. This document is a revision to an earlier draft document (dated May 2015) reviewed and commented on by DTSC in March 2016. The report summarizes the results of soil samples collected to define the extent of chemical contamination at NASA-administered sites at SSFL. DTSC is completing review of the document.

GROUNDWATER:

On February 21, 2018, NASA submitted a NASA-Specific Sitewide Groundwater Quality Sampling and Analysis Plan. This document in an update of a previous 2010 document, and reflects information gathered during NASA's 2011-2016 investigation of the NASA SSFL Areas of Impacted Groundwater (AIGs). DTSC is reviewing the document.

On May 9, NASA submitted a draft RCRA Facility Investigation (RFI) report summarizing the results of NASA's 2013-2016 groundwater source investigations conducted at four sites (the Former Liquid Oxygen (LOX) Plant Area, the Expended Launch Vehicle (ELV)-Building 204 Area, and the former Alfa-Bravo and Coca-Delta Test Stand Areas).

- On April 24, 2018 DTSC issued comments to NASA on the LOX Plant Area of Impacted Groundwater volume of the draft RFI Report. DTSC continues to review the other volumes.

On July 5, 2017, NASA submitted the Human Health and Ecological Risk Assessments for NASA Areas of Impacted Groundwater (AIGs), dated June 22, 2017. This document is a section of the May 2017 NASA Groundwater RI report referenced above. DTSC is reviewing the document.

On September 11, 2017, NASA submitted a Work Plan addendum to further explain their approach for conducting Corrective Measures Studies on groundwater and vadose zone bedrock. DTSC is reviewing the document.

DEMOLITION:

Removal of inactive infrastructure and support equipment continued at the former Bravo, Alfa and Coca areas. NASA is procuring services for 2018 Phase 4 demolition activities, which are scheduled to be the final major NASA demolition efforts prior to the commencement of soil remediation. NASA demolition activities at SSFL are conducted under Ventura County authority.

PERMITTING:

In June 2016, NASA submitted a draft post-closure permit renewal application for the Area II Surface Impoundments. DTSC has reviewed the documents for technical completeness. Final permit renewals are pending until recent legislative changes to post-closure permit requirements under California Code of Regulations Title 22, Article 6 are finalized and implemented.

On April 13, 2018, NASA submitted a RCRA Post-Closure Permit First Quarter 2018 Quarterly Progress Report for the Area II post-closure sites. This report summarizes groundwater monitoring results at the four NASA sites with post-closure permits.

The post-closure requirements for the Area II Surface Impoundments are regulated by DTSC under RCRA laws and regulations because these impoundments are former hazardous waste facilities. The required cleanup levels for the impacted soil will continue to be dictated by the 2010 Administrative Order on Consent for Remedial Action (AOC).

DOE

SOILS:

On December 29, 2016, DOE submitted a Draft Chemical Data Summary Report. The report summarizes the results of soil samples collected to define the extent of chemical contamination in soil in Area IV and the Northern Buffer Zone at SSFL. On April 24, 2018, DTSC provided comments based on review of this report.

In 2012, US Environmental Protection Agency (US EPA), in coordination with DTSC and DOE, completed sampling efforts to define the nature and extent of Area IV radiologic contamination.

DOE conducted soil treatability studies to evaluate onsite soil treatment technologies that could potentially reduce the volume of contaminated soil to be excavated and transported from Area IV. The treatability studies addressed soil partitioning, mercury valence state in soil, bioremediation, phytoremediation, and natural attenuation, as well as residual fuel hydrocarbon characterization methods. The soil treatability studies study plans, evaluation reports and Summary Report have been uploaded to the DTSC-SSFL DOE Soil Treatability Studies web page.

GROUNDWATER:

DOE has completed the majority of its field investigation of groundwater contamination at DOE sites at SSFL in support of the RFI's objective of defining the nature and extent of groundwater impacts. The findings from the RFI groundwater investigation are presented in "Preliminary Draft RCRA Facility Groundwater Investigation Report (GW RFI Report) Area IV, Santa Susana Field Laboratory, Ventura County, California", dated June 16, 2017. DTSC provided comments dated March 23, 2018, to DOE regarding the draft report.

The 2007 Consent Order for Corrective Action requires submittal of Corrective Measures Study Work Plans that detail the methodology for developing and evaluating potential corrective measures to remedy chemical contamination at SSFL. In April of 2009, a Feasibility Study Work Plan was submitted to DTSC. In a letter dated June 27, 2013, DTSC conditionally approved the Feasibility Study Work Plan, and required submittal of a CMS Report, as well as submittal of CMS Work Plan Addenda that fully describe the scope of work required for multiple CMS efforts. In an email dated March 28, 2017, DTSC clarified that work plan addenda are required in the corrective action process at SSFL, and DOE's soil cleanup activities are regulated through the 2010 AOC and does not require a CMS Work Plan Addenda. A CMS Work Plan Addenda is, however, required to describe the scope of work required for site-wide groundwater cleanup required under the 2007 Consent Order, including DOE's groundwater and bedrock

vadose zone CMS efforts in Area IV. On February 20, 2018 DOE, submitted a draft Corrective Measures Study Work Plan addendum (CMS Work Plan addendum) to further explain their approach for conducting Corrective Measures Studies on groundwater and vadose zone bedrock to address groundwater issues described in the Area IV GW RFI Report that are the responsibility of DOE. DTSC is reviewing the document.

While sufficient data has been gathered to date by DOE to support our general understanding of the nature and extent of groundwater impacts at DOE sites in Area IV, focused additional investigation will be conducted to refine our understanding of VOC source areas for purposes of groundwater remediation planning. In April 2018, DOE collected nineteen soil gas samples: eleven at the former sodium disposal facility (FSDF), five at the Building 4009 leach field, and two at the former Building 4457. These activities were proposed in the "Area IV Groundwater Source Investigations – Work Plan Addendum" which proposed collection of passive soil gas samples in the area of the FSDF ponds (to better understand the edges of the VOC plume in the vicinity of the FSDF former ponds), as well as at the Building 4009 Leach Field (to better understand the source of VOCs observed in groundwater in nearby well RD-91), and at Building 4457 (to better understand the source of VOCs in the vicinity of the Hazardous Materials Storage Area [HMSA's] trichloroethene [TCE] plume. In addition, DOE completed installation of two 40-foot depth piezometers in the HMSA, as proposed in DOE's "Area IV Bedrock Investigation at the HMSA – Work Plan Addendum", dated April 17, 2018, and approved by DTSC via email on April 19, 2018. DTSC continues to provide field oversight during the focused investigation activities.

DOE submitted a "Draft White Paper on Thermal Remediation Technologies for Treatment of Chlorinated Solvents". This document was submitted because in-situ thermal remediation has been identified as a potentially applicable remedy to address mass removal of chlorinated solvents and other contaminants of concern in groundwater. In a letter dated February 7, 2018, DTSC requested resubmittal of the Draft White Paper to include radio frequency heating as one of the technologies to be evaluated. DOE is to submit the revised White Paper to DTSC as a final document for review and approval.

Starting in November 2017, DOE initiated extracting groundwater from well RS-54 as part of the Groundwater Interim Measure (GWIM) at the Area IV Former Sodium Disposal Facility (FSDF). The objective of the GWIM at the FSDF is to remove contaminant mass and reduce the threat to underlying Chatsworth Formation groundwater. Well RS-54 is within the footprint of the former pond, extends 40 feet into bedrock, and has exhibited elevated concentrations of trichloroethene in groundwater. It is used to monitor shallow perched groundwater that is likely derived by rainfall that infiltrated to the subsurface and is impacted by contaminants contained in near-surface bedrock fractures. DOE has indicated that water levels in this well are highly dependent on seasonal rainfall. The well is dry during below average rain years, and has measurable levels of water that can be extracted during average rainfall years. Initially, groundwater extraction proceeded slowly with waiting periods in between pumping to allow for water levels to rise. The extracted water from this well was pumped to a nearby storage tank, and 308 gallons were transported off site for proper treatment and disposal at a licensed facility. During the April period, approximately 11 gallons have been pumped. The recovery periods between pumping have been increasing in duration. Evaluation of data collected during groundwater extraction continues, to better understand the sustainability of dewatering activities, as well as the hydraulic properties and distribution of the residual mass of volatile organic compounds (VOCs) in the upper bedrock that underlies the FSDF. As of May 4, 2018, approximately 319 gallons of groundwater have been removed via pumping of RS-54.

DOE evaluated the recent pumping and analytical results, and the findings will be summarized in a Technical Memorandum. DOE periodically meets with DTSC to discuss the ongoing implementation of the GWIM.

On April 26, 2018, DOE and DTSC representatives met to discuss coordination of the process and timing of DTSC review and approval of DOE documents. DOE anticipates completion of focused investigations in the field to address groundwater data gaps. Also, DOE and DTSC have a goal for issuing final EIS/EIR by the end of the calendar year, so coordination is vital to maintain this time frame. DOE and DTSC will continue with monthly calls and will meet on a quarterly basis to coordinate review of DOE's upcoming deliverables.

BOEING

Boeing is finishing soils investigation work in Area I, Area III, and the southern buffer zone. Boeing's surficial media characterization work is divided into units identified as Boeing RFI Subareas:

- 1A North, 1A Central, 1A South
- 1B North, 1B Southwest, 1B Southeast
- 5/9 North, 5/9 South, and
- Group 10

SURFICIAL MEDIA INVESTIGATION:

Boeing is using the Data Quality Objectives (DQOs) process and standard operating procedures for planning and conducting sampling work to complete the characterization of surficial media. The purpose of the current phase of surficial media investigation work is to collect sufficient data to fill data gaps that were identified in the 2007 and 2008 Group RFI Reports. All Boeing sites are in the data evaluation and reporting work phases.

- ***Subarea 5/9 South*** - Systems Testing Lab (STL-IV), Compound A, Sewage Treatment Plant (STP)-3, and Environmental Effects Laboratory (EEL), and areas not associated with RFI sites in Subarea 5/9 South
  - Boeing submitted responses to comments and revised RFI Data Summary Reports for Subarea 5/9 South on April 27, 2017.
  - DTSC sent comments to Boeing on April 25, 2018.
- ***Subarea 1A Central*** - Building 359, Advanced Propulsion Test Facility (APTF), and Happy Valley North and areas not associated with RFI sites in Subarea 1A Central
  - Boeing submitted responses to comments and revised RFI Data Summary Reports for Subarea 1A Central on May 24, 2017.
  - DTSC is reviewing the Report.
- ***Subarea 10*** (Southern Buffer Zone)
  - Boeing submitted the RFI Data Summary Report for Subarea 10 on June 19, 2017.
  - DTSC is reviewing the report.
- ***Subarea 5/9 North*** - Silvernale, Engineering Chemistry Laboratory (ECL), and areas not associated with RFI sites in Subarea 5/9 North
  - Boeing submitted the RFI Data Summary Report for 5/9 North on July 26, 2017.
  - DTSC is reviewing the report.
- ***Subarea 1A South*** - Canyon, Happy Valley South, Laser Engineering Testing Facility (LETF)/CTL-I, and areas not associated with RFI sites in Subarea 1A South
  - Boeing submitted the RFI Data Summary Report for 1A South on August 22, 2017.
  - DTSC is reviewing the report.

- ***Subarea 1B Southeast*** – Chemical Test Lab (CTL)-III, Perimeter Pond, and areas not associated with RFI sites in Subarea 1B Southeast.
  - Boeing submitted the RFI Data Summary Report for 1B Southeast on September 29, 2017.
  - DTSC is reviewing the report.
- ***Subarea 1B North*** - Bowl, R-1 Pond, and areas not associated with RFI sites in Subarea 1B North
  - Boeing submitted the RFI Data Summary Report for 1B North on November 19, 2017.
  - DTSC is reviewing the report.
- ***Subarea 1A North*** - B-1, Instrument & Equipment Laboratory (IEL), Area 1 Landfill, and areas not associated with RFI sites in Subarea 1A North
  - Boeing submitted the RFI Data Summary Report for 1A North on December 18, 2017.
  - DTSC is reviewing the report.
  - Former Shooting Range
    - The Former Shooting Range is not part of Subarea 1A North but the site information is included here as the Former Shooting Range is located on the Mountains Recreation Conservancy Authority, Sage Ranch property which is adjacent to Subarea 1A North and some soil data overlap between the Former Shooting Range area and Subarea 1A North.
    - The work is being conducted under an approved work plan and addendum.
    - Field work to investigate soils to define the extent of lead shot and clay pigeons as well as characterize the soil for lead, arsenic, antimony, and polynuclear aromatic hydrocarbon concentrations began in late September 2016 and was completed on January 18, 2017.
    - Laboratory analysis for soil sampling is complete.
    - Boeing constructed a fence to prevent access to a 1,200-foot section of the Sage Ranch Loop Trail where sampling results indicate remediation is necessary to address lead concentrations in soil.
    - Boeing released a statement to community members regarding the status of the sampling results, the need for remediation, and the closure and re-routing of a portion of the trail.
    - The Draft Former Rocketdyne-Atomics International Rifle and Pistol Club Shooting Range Investigation Area Data Summary Report and Findings Report was submitted to DTSC on April 11, 2017. DTSC provided comments on the report to Boeing on May 5, 2017. DTSC received responses to DTSC comments on July 11, 2017. DTSC sent a letter dated November 15, 2017 requiring Boeing to conduct further characterization and evaluation of the impacted media that may have entered the Northern Drainage from the Former Shooting Range. DTSC received the Work Plan Addendum for additional field work on February 28, 2018. DTSC provided comments to Boeing on April 13, 2018.
    - On September 12, 2017 DTSC and the Los Angeles Regional Water Quality Control Board conducted a site inspection of recently installed storm water best management practices (BMPs) used to control storm water runoff from the Former Shooting Range into the Northern Drainage. Based on the site inspection DTSC and the LARWQCB expect the BMPs to be evaluated by the Expert Panel and upgraded if appropriate.
- ***Subarea 1B Southwest -*** Area I Burn Pit, CTL-V, and areas not associated with RFI sites in Subarea 1B Southwest
  - Boeing submitted the RFI Data Summary Report for 1B Southwest in late December. It was received by DTSC on January 2, 2018.
  - DTSC is reviewing the report.

- **Risk Assessment**
  - Risk Assessments were included in the two draft RFI Data Summary and Findings Reports submitted to date (Subareas 5/9 South and 1A Central).
  - Based on DTSC review comments and changes in risk assessment input parameters by the USEPA, the risk assessment process will need to undergo some changes.
    - Boeing submitted a draft risk assessment work plan on May 18, 2017.
    - DTSC sent Boeing a letter on January 16, 2018 rejecting the revised work plan. Boeing will submit a revised work plan will be submitted for DTSC review when DTSC completes its evaluation of the exposure factors that will be used in future risk assessments.

GROUNDWATER:

- Faults
  - In 2016, Boeing submitted draft technical memorandum evaluating faults (main document and appendices) and an update. The concepts presented in the faults technical memorandum have been incorporated into the draft Remedial Investigation (RI) Report
  - DTSC is evaluating the faults work within the context of the draft RI Report.
- Groundwater Flow Model
  - Boeing continues to work to update the 3D Groundwater Flow Model.
- Boeing groundwater characterization work in Area IV
  - Seven wells were installed by Boeing in Area IV; evaluation of the hydrologic data is ongoing.
- Draft Remedial Investigation Report
  - On June 8, 2017 Boeing submitted a draft RI Report summarizing the results of groundwater characterization work for Area I, Area III and the Southern Buffer Zone. DTSC is reviewing the document.
- Boeing Sites in Area IV
  - On August 24, 2017 Boeing submitted a work plan addendum to further explain their approach for conducting Corrective Measures Studies on groundwater and vadose zone bedrock. DTSC is reviewing the document.

BUILDING DEMOLITION:

The Superior Court of California, County of Sacramento, continues to evaluate the ongoing litigation over the demolition of Boeing buildings in SSFL Area IV. Per the December 11, 2013, temporary injunction, DTSC will not issue correspondence regarding the matter until the court issues a decision. A court hearing on the matter was scheduled for May 4, 2018, but was rescheduled by the court to a future date on May 3, 2018.

PERMITTING:

In October 2015, Boeing submitted a draft post-closure permit renewal application for the Areas I and III Surface Impoundments and a separate Closure Plan for the Thermal Treatment Facility. DTSC is currently reviewing the Areas I and III Surface Impoundment post-closure permit application for technical adequacy. DTSC has temporarily suspended review of the Closure Plan for the Thermal Treatment Facility pending ongoing discussion of risk assessment requirements.

The post-closure requirements for the Area I and III Surface Impoundments and closure requirements for the Thermal Treatment Facility are regulated by DTSC under RCRA laws and regulations because both

are former hazardous waste facilities. The required cleanup levels for the impacted soil and groundwater will continue to be dictated by the 2007 Consent Order.

SITEWIDE GROUNDWATER CHARACTERIZATION AND CLEANUP

The SSFL groundwater characterization and cleanup program is being conducted by the three responsible parties; Boeing, DOE and NASA. The groundwater characterization and cleanup program consists of:

- Investigation and characterization of groundwater contamination;
- Groundwater monitoring;
- Groundwater interim measures; and
- Treatment of contaminated groundwater with permitted discharge from the Groundwater Extraction and Treatment System.

GROUNDWATER REMEDIAL INVESTIGATION (GWRI)

Data gaps were identified in the 2009 GWRI Report by the RPs. DTSC also identified additional data gaps that were presented in the GWRI comments. The data gap work has been divided into six categories:

- Data gaps identified in the Remedial Investigation (RI) Report;
- Source Zone Characterization;
- Characterization of seeps and springs;
- Characterization of faults;
- Groundwater flow model; and Contaminant transport modeling.

STATUS OF GWRI DATA GAP WORK

Boeing, DOE and NASA have submitted Draft RFI Reports report summarizing the results groundwater investigations conducted at their respective sites. DTSC is reviewing and issuing comments on the documents. Additionally, Boeing, DOE and NASA are working on a single, overarching site summary document for groundwater characterization at the SSFL site.

Groundwater modeling efforts are proceeding:

- Groundwater flow model
  - The conditionally approved, groundwater flow model work plan presents an approach for a mountain scale groundwater flow model.
    - Work from the fault studies and data from monitoring wells installed since 2009 will be used to supplement the groundwater flow model. DTSC, Boeing, DOE and NASA are considering applying the revised model at the remedy design stage of the project.
- Contaminant transport modeling
  - Boeing, DOE and NASA continue to develop the approach for contaminant transport modeling.

SITEWIDE GROUNDWATER TREATABILITY STUDIES

Treatability studies have been conducted on several technologies to be evaluated in the feasibility study. The treatability studies address both soil/bedrock and groundwater contamination. Treatability studies can be either field studies or laboratory studies.

- Four groundwater laboratory studies were conducted:
  - Chemical oxidation using potassium permanganate;
  - Thermal heating of rock core;

        - DOE submitted a revised white paper study of thermal heating of fractured bedrock to DTSC in September 2017. DTSC reviewed the document and submitted comments on February 7, 2018.
    - Microbial characterization and Bio-Stimulation of rock core, pore water;
        - Boeing submitted the report called *Laboratory Evaluation of Biostimulation to Treat Chlorinated Ethenes in the Chatsworth Formation* and submitted it to DTSC on July 10, 2017.
        - DTSC is reviewing the report.
- Two field studies were conducted:
    - In-situ chemical oxidation (ISCO) using potassium permanganate;
        - Boeing developed a summary report for ISCO and submitted it to DTSC on June 14, 2016.
        - DTSC issued comments to Boeing on June 16, 2017. Boeing provided responses to DTSC comments on August 28, 2017. DTSC reviewed the responses and provided comments on both the responses and the report on February 7, 2018.
    - Bedrock vapor extraction (BVE);
        - Conducted at NASA's former Bravo test area in late 2014.
        - NASA has submitted the Technical Memorandum: *Results from Bravo Bedrock Vapor Extraction Treatability Study* dated November 2015 to DTSC.
        - DTSC has reviewed and commented on the report.

GROUNDWATER MONITORING

Groundwater monitoring reports are submitted quarterly, with the fourth submittal being an annual report. DTSC reviews the quarterly reports for completeness and compliance but may not issue written comments on the specific quarterly report if significant issues are not present. If compliance issues arise during review of the quarterly groundwater monitoring reports, DTSC directs the Responsible Parties to take action to comply, and follows up to ensure compliance is achieved and maintained.

The annual reports present the results of the previous year's monitoring and undergo a more thorough review. Annual Report for DOE, NASA and Boeing groundwater monitoring activities were submitted to DTSC on March 12, February 21 and February 26, 2018 respectively. DTSC is reviewing the Reports.

GROUNDWATER INTERIM MEASURES (GWIM)

The GWIM project includes the operation of fourteen groundwater extraction wells. The water will be pumped to the existing Groundwater Extraction Treatment System (GETS) for treatment. GETS effluent is regulated by the Los Angeles Regional Water Quality Control Board (LARWQCB).

- On October 2, 2017, the LARWQCB enrolled Boeing under General Waste Discharge Requirements to regulate injection of GETS effluent to WS-5. Surface discharge of GETS effluent regulated under an NPDES permit can proceed after securing a Streambed Alteration Agreement with the California Department of Fish and Wildlife.
- GWIM and GETS infrastructure is complete, and permits are in place. Operations will begin after baseline groundwater sampling and system commissioning have are complete. Full operations of the is anticipated to start in June.
- As described above, DOE is pumping from RS-54 at FSDF in Area IV, and handling and disposing of the extracted groundwater as liquid waste.

OPERATION OF WS-9A

WS-9A, located in the southwest corner of Area II, north of the southern buffer zone, is on a pumping program to lower the groundwater elevation near seep SP-890 with a goal of reducing the amount of Trichloroethene (TCE) contamination in groundwater in the immediate area. When operating, groundwater extracted from WS-9A is pumped to the GETS.

- Except for intermittent testing in December 2012 and January 2013, WS-9A has not been pumping since November 2012.
  - The water levels in the seep areas downstream of WS-9A are being monitored. If seepage occurs, it is mechanically collected.
  - Pumping at WS-9A will resume when the GWIM is restarted. The extraction of water at the well will be optimized to perform the intended function at as low a rate as practical.

GROUNDWATER RFI REPORT

Working toward a report format approved by DTSC in January, 2017, Boeing, DOE, and NASA prepared and submitted individual report sections for their specific groundwater characterization activities. The individual report sections were submitted by Boeing on June 2, 2017, DOE on June 15, 2017, and NASA on May 8, 2017. DTSC is reviewing the reports, and submitted comments on the DOE section on March 25, 2018. The individual sections will be part of single sitewide report deliverable.

FEASIBILITY STUDY / CORRECTIVE MEASURES STUDY

DTSC has conditionally approved the Feasibility Study work plan. Cleanup of sitewide groundwater and surficial media in Boeing areas will be regulated under Chapter 6.5 of Division 20 of the Health and Safety Code (California Hazardous Waste Control Law and the Resource Conservation and Recovery Act authorizations). Soils in DOE and NASA areas will be cleaned up under the respective AOCs, and Soils Remedial Action Implementation Plans (SRAIPs) will be prepared to describe their respective cleanup activities. DTSC has received, and is reviewing Boeing's DOE's and NASA's Corrective Measures Studies Work Plan addenda for groundwater and vadose zone bedrock.

PUBLIC OUTREACH

DTSC's Office of Public Participation conducted the SSFL Bi-Annual Community Meeting on Tuesday, April 10, 2018. It was held at the Corporate Pointe Auditorium, 8521 Fallbrook, West Hills, CA 91304. More than seventy community members were in attendance and 26 of them provided comments. The SSFL Bi-Annual meeting began with an open house that included station areas with subject matter experts on the following:

- Project Overview
- Offsite Investigations
- Groundwater Investigations, and
- Status Updates and Upcoming Milestones regarding the Site's Responsible Parties, DOE, NASA, and the Boeing Company.

Since the close of the Public Comment Period for the SSFL Draft Program EIR and Draft PMP, which ran from Thursday, September 7, 2017 to Thursday, December 14, 2017, DTSC has also been reviewing comments to the SSFL draft PEIR and draft PMP. More than 3,000 individual comments were received, and DTSC anticipates concluding its review by the end of the year.

In April 2018, the Office of Public Participation also responded to the public regarding general project inquiries and uploaded 27 documents regarding the Resource Conservation and Recovery Act (RCRA) Facility Investigations. The following documents were uploaded to the Document Library on DTSC's website:

Documents submitted in April 2018

1. April 2018 Biannual Meeting Presentation
2. Area IV Bedrock Investigation FSDF – Work Plan Addendum
3. Area IV Bedrock Investigation HMSA - Work Plan Addendum
4. Area IV Groundwater Source Investigations - Work Plan Addendum
5. DTSC comments on DOE Draft CDSR
6. DTSC Cover Letter and Comments on the Boeing 5/9 South RFI Report
7. DTSC Cover Letter and Comments on the Former Shooting Range Work Plan Addendum
8. DTSC Update Regarding Boeing Monitoring
9. DTSC Update Regarding DOE Monitoring
10. DTSC Update Regarding NASA Monitoring
11. Groundwater Monitoring Update
12. Letter from Mark Malinowski to RPs regarding the Startup of the Baseline Air Monitoring at SSFL
13. NASA Post Closure Permit First Quarter 2018 Report
14. Poster - DTSC Update Regarding Boeing
15. Poster - DTSC Update Regarding NASA Status
16. Poster - Status of Offsite Investigations
17. Poster - Total Petroleum Hydrocarbons
18. Poster Regarding DOE Progress
19. Poster Regarding Groundwater Status Update
20. Poster Regarding Shooting Range Investigations Update
21. SSFL Frequently Asked
22. SSFL Loop Trail Detour
23. SSFL Public Meeting Announcement
24. SSFL Team Directory Rev 04_2018
25. Total Petroleum Hydrocarbons Fact Sheet
26. Update Regarding Offsite Investigations
27. Update Regarding Shooting Range Investigations

The RCRA documents listed above are drafts only. They are RCRA Facility Investigations required by the 2007 Consent Order or 2010 Administrative Orders on Consent (AOC). The publication date refers to the completion date by the responsible party and not the submission or receive date by DTSC. Each submission is currently under review by DTSC and includes a notice on the cover page identifying the document(s) as draft.

SSFL ACTIVITIES ANTICIPATED AFTER APRIL 2018

DTSC

DTSC is compiling comments received on the Draft PEIR and Draft PMP, and will generate responses to those comments.

NASA

- DTSC will complete review of NASA's February 2017 revision of the Soil Data Summary Report. It is anticipated that our review will conclude in Summer 2018.
- NASA will continue demolition and removal of ancillary structures and buildings at the Alfa, Bravo and Coca sites. NASA does not plan to demolish any historic test stand structures as part of their current program. NASA demolition activities are conducted under Ventura County authority.
- DTSC will continue to review NASA's May 2017 Remedial Investigation (RI) Report, June 2017 Human Ecological Risk Assessment and February 2018 Sampling and Analysis Plan for groundwater investigations conducted at NASA sites.
- DTSC and NASA will meet to discuss NASA CMS planning.

DOE

- DTSC will meet with DOE to discuss our comments regarding the draft Chemical Data Summary Report.
- DTSC will conduct final review, upon receipt of DOE's revised Thermal Treatability Study.
- DOE and DTSC will continue data evaluation and groundwater discussions.
- DOE will continue GWIM operations, as well as associated data evaluation.
- DOE will install additional groundwater monitoring wells in Area IV, as proposed in the focused investigation work plan addendums.
- DTSC will continue to coordinate and meet with the federal and state biologists to discuss state and federal requirements for protection of natural resources at SSFL.

BOEING

SURFICIAL MEDIA INVESTIGATION

- Preparation of the RFI summary reports and Risk Assessment is ongoing for all Boeing sites and subareas. RFI summary reports and risk assessments are being submitted separately. Boeing has submitted all nine Data Summary and Findings Reports for Areas I and III. DTSC anticipates continuing to review the RFI DSFRs in May 2018.
- DTSC is reviewing the 1A Central RFI DSFRs and responses to comments.
- DTSC is reviewing the Subarea 10, 5/9 North, 1A South, 1B Southeast, 1B North, 1A North, and 1B Southwest RFI DSFRs.
- DTSC is reviewing the report on Laboratory Evaluation of Biostimulation to Treat Chlorinated Ethenes in the Chatsworth Formation.
- DTSC is reviewing the responses to DTSC comments and the Revised Former Shooting Range Work Plan Addendum.

GROUNDWATER

- Faults
  - DTSC is evaluating the concepts presented in the faults technical memorandum within the context of the draft RI Report.
  - DTSC is reviewing Boeing's revised, draft fault technical memorandum that includes the work conducted since the submittal of the 2009 RI Groundwater report.
- Boeing groundwater characterization work in Area IV
  - Evaluation of the hydrologic data for source zones is ongoing.
- Groundwater flow model.
  - The groundwater flow model continues to be developed.
- Groundwater Report.
  - DTSC is reviewing the Boeing section of the site-wide Groundwater RFI Report submitted in June 2017.

STORMWATER MONITORING AND SAMPLING

- To comply with Los Angeles Regional Water Quality Control Board requirements, Boeing will monitor flow and collect samples as needed during rain events.

FEASIBILITY STUDY / CORRECTIVE MEASURES STUDY (CMS)

- DTSC is reviewing the Boeing CMS Work Plan Addendum for the CFOU.
- DTSC is reviewing the DOE CMS Work Plan Addendum for the CFOU.
- DTSC is reviewing the NASA CMS Work Plan Addendum for the CFOU.

SITEWIDE GROUNDWATER

DTSC is reviewing and commenting on the individual report sections for Boeing's, DOE's and NASA's specific groundwater characterization activities. The individual sections are intended to be part of single sitewide report deliverable that is under development.

PUBLIC OUTREACH

The following Public Participation activities are anticipated in the next 30 days:

- The DTSC SSFL Monthly Update Report for May will be posted online and added it to the "What's New" page;
- SSFL Document Upload Notification: regarding RCRA Facility Investigations will continue to be provided; and
- Update the Public Participation Plan to include the draft PEIR and draft PMP as well as the bi-annual meeting outreach process, next steps, and the outreach strategy moving forward.

GENERAL PROJECT SCHEDULE

The current schedule goal is to finalize the PEIR in 2018 and for all three RPs to have draft cleanup decision documents to DTSC in late 2018 to early 2019. Cleanup activities are currently anticipated to begin in 2019.

The departure from the 2017 schedule presented in the Consent Order and referred to in the AOCs is due to the recognized complexity of the project, including the rugged physical nature of the site, multiple responsible parties, and the need to complete several phases of investigation to define the nature and extent of impacted soils. In addition, as described in Section 4.3 (of the Program Management Plan), during the investigation phases, several cleanup actions were taken.

Project cleanup schedules will be further defined in the remediation planning documents and associated designs, however if soil cleanup begins in early 2019, remediation of all chemically and radiologically impacted soils is anticipated to be completed by the end 2034.

2 PROJECT OVERVIEW

The SSFL is located 30 miles northwest of downtown Los Angeles in southeastern Ventura County, near the crest of the Simi Hills at the western border of the San Fernando Valley. A former rocket engine test and nuclear research facility, the 2,849-acre field laboratory is currently the focus of a comprehensive environmental investigation and cleanup program, conducted by Boeing, DOE and NASA, and overseen by DTSC.

Boeing owns and operates Area I, except for the approximately 41-acre former Liquid Oxygen (LOX) Plant area, and all of Areas III and IV. Areas I and III are operated by Boeing. Boeing also owns the approximately 1,143-acre southern buffer zone and 182-acre NBZ. NASA is responsible for cleanup and administration of Area II and the former LOX Plant, but it is owned by the federal government. Boeing owns and operates Area IV but DOE is responsible for cleanup of soils in Area IV and the NBZ

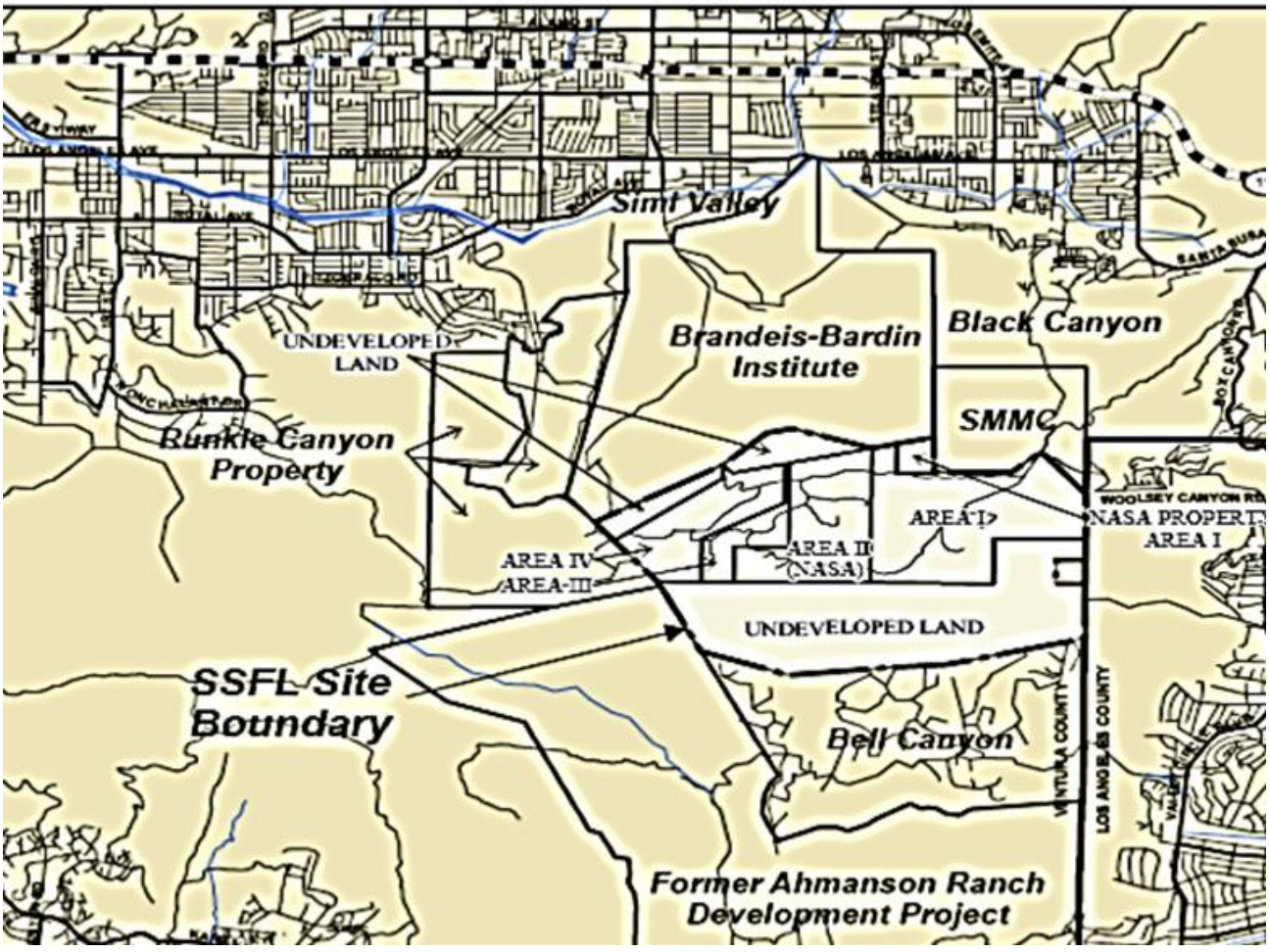

Figure 1 – SSFL and Surrounding Area

DOE

DTSC and DOE participated in chemical soil sampling efforts in Area IV of the SSFL property where former DOE activities occurred on the Site. Area IV is a 290-acre area located in the northwestern section of the site. DOE owns facilities on a 90-acre site within Area IV. Area IV includes the Energy Technology Engineering Center (ETEC) facility where nuclear research, development, and testing began in the 1950's.

The Area IV radiological soil sampling effort, conducted by the US EPA, was completed in 2012. The US EPA approached the investigation by splitting the Area IV and NBZ investigation into historical site assessment (HSA) subareas. The chemical soil sampling efforts followed the same HSA subarea designations. DOE and DTSC participated in Area IV and NBZ co-located soil sampling for chemical contaminants.

DOE completed the chemical soil characterization sampling in 2014. The sampling included three phases, as specified in the December 2010 AOC, signed by DTSC and DOE:

- Phase 1 - co-located sampling for chemical analysis at US EPA's first phase of radiological sampling locations in Area IV and the NBZ.
- Phase 2 - sampling at randomly selected sampling locations, and
- Phase 3 - identify the locations at the Site where insufficient chemical data exists (chemical data gaps) and sample as appropriate.

In 2012, the US EPA, in coordination with DTSC and DOE, completed its second round of sampling efforts to define the nature and extent of radiologic contamination in Area IV.

US EPA's round two sampling locations were based upon the validated sampling results they received from their Round 1 sampling.

Not all of US EPA's Round 2 sample locations were sampled for chemical contaminants in 2012 and chemical data gap investigation locations may have been required where no radiological sampling was needed. In 2013-2014, the rationale and selection of chemical data gap investigation sampling locations for Area IV were provided, discussed with the community, and implemented. The Area IV chemical data gap sampling is now complete. The radionuclide and chemical results from these investigations are being used for remediation planning. A Draft Chemical Data Summary Report was submitted to DTSC on December 29, 2016. DOE Draft Environmental Impact Statement was issued to the public on January 6, 2017.

DOE has completed investigations of groundwater source areas at DOE sites in Area IV, with the goal of characterizing the nature and extent of contaminant releases at these areas for groundwater remedial planning. DOE's findings will be presented in a site-wide RCRA Facility Investigation Report, which is anticipated to be submitted in 2018.

NASA

NASA has concluded chemical data gap investigations of soil and surficial media characterization at the 41.7-acre NASA administered portion of Area I (the former LOX Plant), and 404-acre Area II. NASA Area II was used primarily for rocket engine testing and includes the Alfa, Bravo, Coca, former Delta Test Stands and support structures. Under the terms of the December 2010 AOC, NASA implemented six Field Sampling Plans (FSPs) to complete the AOC soil investigations.

The five NASA surficial media FSPs include:

- FSP-1 - Alfa-Bravo Fuel Farm, Coca-Delta Fuel Farm, Propellant Load Facility
- FSP-2 - Incinerator/Ash Pile/STP, Building 204, Storable Propellant Area (SPA), and Skyline Road
- FSP-3 - Alfa Test Stand, Bravo Test Stand
- FSP-4 - LOX Plant, Area II Landfill, ELV
- FSP-5 - Coca Test Stand, former Delta Stand, R2 Ponds

The sampling proposed in the FSPs is complete, and DTSC is reviewing NASA's draft Data Summary Report for soils characterization work in the NASA areas of the site.

NASA is conducting extensive investigations of five major groundwater source areas at Area I LOX Plant and Area II, with the goal of characterizing the nature and extent of contaminant releases at these areas for groundwater remedial planning.

BOEING

Boeing owns most of Area I and all of Areas III and IV. Areas I and Ill total 792 acres and are operated by Boeing. Boeing also owns the 1,143-acre southern buffer zone and 182-acre NBZ. Soils in Area IV and the NBZ are being characterized in the DOE portion of the project.

Boeing sites are in Reporting Groups 1A, 1B, 5, 9 and 10. Boeing has reorganized the sites in subgroups identified as Boeing RFI Groups:

- 1A North, 1A Central, 1A South
- 1B North, 1B Southwest, 1B Southeast
- 5/9 North, 5/9 South, and
- Group 10

The proposed sampling is substantially complete, and Boeing has begun submitting data summary reports for DTSC review.

Boeing is conducting investigations of groundwater source areas at Boeing sites in Area I and Area III, with the goal of characterizing the nature and extent of contaminant releases at these areas for groundwater remedial planning.

Additional Information can be found on DTSC's website at:
www.dtsc.ca.gov/SiteCleanup/Santa_Susana_Field_Lab